AWARDS/RECOGNITION

Human Effectiveness

Materials and Manufacturing

Propulsion

Sensors

Space Vehicles

Four Scientists Selected as AFRL "Fellows"

Payoff

The AFRL "Fellows" induction ceremony banquet held in November at the United States Air Force Museum honored Dr. Daniel Repperger, Human Effectiveness Directorate, Wright-Patterson AFB, Ohio; Dr. Edward E. Altshuler, Sensors Directorate, Hanscom AFB, Massachusetts; Dr. Susan Gussenhoven-Shea, Space Vehicles Directorate, Hanscom AFB, Massachusetts; and Dr. Daniel B. Miracle, Materials and Manufacturing Directorate, Wright-Patterson AFB, Ohio. The laboratory relies on its "Fellows" for advice on substantial issues and representation of the laboratory's endeavors and interests in the national and international scientific and engineering communities.

Accomplishment

Dr. Repperger established himself as a leader in the scientific community by modeling human control performance in complex flight motion environments. His patent was the original in the field of haptic control devices. These devices became widespread in the computer game and flight simulation industry. Application of this technology in the field of rehabilitation medicine is touching and improving the lives of motorically injured and impaired people. Dr. Altshuler, an internationally recognized expert in the field of electromagnetics, made significant contributions to the Air Force, the Department of Defense, the North Atlantic Treaty Organization, and the scientific community. In the early sixties he investigated the feasibility of using the millimeter-wave region of the spectrum for military applications. He recognized that high-gain, high-resolution antennas of moderate size and the compact, lightweight system components obtained at these wavelengths were applicable to space vehicle instrumentation. More recently, he received a patent for the design process of antennas using genetic algorithms. The National Aeronautics and Space Administration sought out Dr. Gussenhoven-Shea, who is recognized as a leading expert in three areas of space research: auroral physics, spacecraft charging, and space radiation effects to serve as an expert on its teams. During her time with the lab, she garnered leadership roles in both the Spacecraft Charging at High Altitudes and Combined Release/Radiation Effects Satellite programs. These satellites carried the most advanced set of experiments ever flown to study spacecraft arcing and microelectronic upsets. Dr. Miracle's research led to significant advancements in intermetallic alloys and metal matrix composites (MMC's). His recent research on MMCs contributed to the first Air Force specification of a fiber-reinforced metal matrix composite and the first aerostructural component of particle-reinforced MMC. The latter application resulted in a $26 million savings to the Air Force.

Background

Military and civilian scientists and engineers, comprising about 59% of the AFRL workforce, are eligible for selection as an AFRL "Fellow." To be eligible, participants must be assigned to AFRL for the past three consecutive years and have at least seven years of active federal service. The recognized work must be performed at the laboratory or one of its predecessors. Appointment as an AFRL "Fellow" confers a lifetime status, recognizing outstanding contributions in research and development and/or exceptional technical program management. Their selection recognizes their sustained high-level achievements in programs of extraordinary importance to AFRL, the Air Force, or national defense.

Dr. Daniel Miracle Earns "Fellow" Appointment

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Payoff

Dr. Daniel B. Miracle, an internationally recognized leader in structural intermetallic alloys and composites, was honored for numerous technological and scientific achievements, including his outstanding support of operational and future Air Force systems vital to national defense.

Accomplishment

Dr. Miracle, a scientist in the Materials and Manufacturing Directorate, has been named a "Fellow" of the 42,000-member American Society for Metals (ASM) International professional organization. Dr. Miracle contributed significantly to the Integrated High Performance Turbine Engine Technology initiative program. This work was important in the revolutionary redesign of conventional gas turbine compressor cross-sections, which allows innovative improvement in thrust-to-weight technology. Dr. Miracle's selection as an ASM "Fellow" recognizes a sustained exemplary performance and highlights a career committed to strengthening the nation's armed forces and aerospace materials community.

Background

Only a small percentage of ASM International members receive an appointment as "Fellow." Dr. Miracle's formal education in materials science and solid state physics is augmented by extensive experience in processing and application of advanced materials technologies. During a career spanning over 20 years, Dr. Miracle made substantial contributions to the fundamental research and exploratory development of structural materials for high-temperature applications and materials with high specific strength and stiffness. He currently leads the Air Force research team establishing fundamental scientific principles required to implement materials with high specific stiffness—a broad, pervasive technology with critical impact on key aerospace technology sectors, such as propulsion, aeronautical structures, space launch vehicles, spacecraft, missiles, and electronics. His work is also linked to commercial applications benefiting the automotive and recreation industries, and initiatives that played a major role in research programs at technical institutions at home and abroad. For example, Dr. Miracle helped establish a technology agreement between the United States and United Kingdom on the use of metal matrix composites for aerospace applications, which led to critical technology demonstrations and advancements in a wide range of aerospace systems, including aerospace propulsion and structures. Systems directly benefiting from Dr. Miracle's efforts include the F-16, B-1, F-22, and Boeing 777. He is internationally recognized for his work in advanced metals and metal matrix composites, and has authored or co-authored more than 70 technical papers and edited four books on the subject. Dr. Miracle is a member of the International Advisory Board for the *Advanced Composites Newsletter*. He is also an eminent engineer of the Tau Beta Pi Society and a member of the National Board of Trustees of the Alpha Sigma Mu International Professional Honor Society for Materials Science and Engineering. Dr. Miracle serves as co-editor of the *Composites Materials Handbook* (second edition), scheduled to be published by ASM International in 2001.

Dr. Ruth Pachter Earns Research Award for Advances in Computational Materials Science

Payoff

Dr. Pachter's research and leadership in computational chemistry and materials science provide researchers the basic understanding and means for far more effective and efficient design of crucial laser resistance materials such as organic optical limiters, liquid crystals, and biomaterials. This basic research is also significant for a variety of other materials design studies in the Air Force and in the scientific community as a whole.

Accomplishment

Dr. Pachter, a scientist with the Materials and Manufacturing Directorate's Hardened Materials Branch, earned the 1998 Air Force Basic Research Award for outstanding contributions in advancing state-of-the-art computational chemistry and materials science. She was also recognized for successful development and operation of the directorate's Virtual Reality Laboratory, enabling manual exploration of the configurational space of molecules using a real-time, force feedback modeling system and three-dimensional display technology. Faster and more efficient than systematic research, the system provides highly accurate responses to design engineers, developing materials that will directly support future Air Force requirements.

Background

Laser hardening materials designed for personnel, sensors, and space protection is a challenge of crucial importance to the Air Force, encompassing novel optical limiting materials with fast response. The design of these materials requires material properties that are carefully optimized in order to achieve, for example, high conjugation, appropriate ground and excited state absorption, and large nonlinear optical coefficients, as well as exhibits-defined structural motifs and folding patterns when the material is derivatized with chromophores. Such complex problems require fundamental advances in the development of new methodologies, algorithms, and parallelization, using high performance computing to overcome the limitations. The result is a predictive capability for effective and efficient design of the materials guiding exploratory research and advanced development programs. Dr. Pachter's approach for solving these problems is three-fold. One element is the development and validation of methods to address limitations and advance the state-of-the-art in computational materials science. Another element is the design of materials with controlled properties for laser hardening through the application of newly developed methods, algorithms, and parallelized advanced computer software. The third element involves gaining a better understanding and enabling the elucidation of structure-to-property relationships for the design and optimization of materials in devices that protect from optical threats. Novel methods are applied in the case of large-scale electronic structure calculations.

Dr. Walter Griffith Appointed "Trustee" of ASM International

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Payoff

The selection of Dr. Griffith as a member of the American Society for Metals (ASM) International Board of Trustees recognizes his outstanding ideas, leadership, and motivation toward high achievement in metals, ceramics, composites, and nondestructive evaluation (NDE) required for current and future Air Force systems. His appointment enhances the Air Force Research Laboratory's reputation as a world leader in materials and manufacturing research and development, and also recognizes its efforts to support Air Force operational requirements vital to national defense.

Accomplishment

A leading materials scientist at the Materials and Manufacturing Directorate was named a "Trustee" of the 42,000-member ASM International professional society. Dr. Walter M. Griffith, Chief of the directorate's Metals, Ceramics and NDE Division, was appointed to a three-year term on the Board of Trustees overseeing the organization's 250 chapters with members in more than 100 countries. Dr. Griffith has been an effective advocate of metallic and ceramic materials and their composites, intelligent processing strategies, manufacturing technologies, and NDE for more than 25 years. His selection recognizes his exemplary oversight in directing and managing a broad-based research and development program, and highlights a career dedicated to strengthening the Air Force and the nation's aerospace materials community.

Background

The mission of ASM International is to gather and disseminate technical information, and foster the understanding and application of engineered materials and their research, design, reliable manufacture, use, and economic and social benefits. This is accomplished via a unique global information-sharing network, education programs, and publications. ASM members are actively involved throughout the materials community as engineers, managers, scientists, researchers, teachers, college students, marketers, equipment manufacturers, and suppliers. Founded by metallurgists, ASM was once known as the "American Society for Metals," but has grown to include an international membership with interests in materials sciences in general. Hence, the society's name was changed to "ASM International" in 1985 to reflect the broadening of its membership. Dr. Griffith has been an active member of ASM for 30 years. Highly respected by his peers, Dr. Griffith directs the activities of 150 personnel, including some 60 scientists and engineers, and manages a fiscal budget of more than $27 million. He also serves as a member of the executive group, which administers the Air Force Materials Research and Development program.

Drs. Mitchel and Wiff Receive Appointments as "Fellows" of the American Physical Society

Payoff

The selection of Dr. William C. Mitchel and Dr. Donald R. Wiff as American Physical Society (APS) "Fellows" recognizes individual achievement and enhances the Materials and Manufacturing Directorate's reputation as a leader in materials research and development. Their contributions helped advance the directorate's in-house research efforts in areas directly benefiting the warfighter and helped strengthen national security.

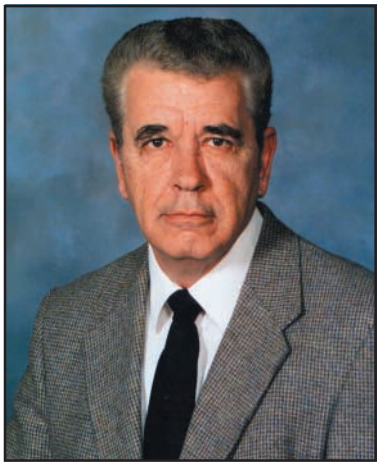
Accomplishment

Two directorate researchers were elected as "Fellows" of the 40,000-member APS in 1999. Dr. Mitchel and Dr. Wiff of the directorate's Survivability and Sensor Materials Division were recognized for their lifetime contributions to physics. Dr. Mitchel was honored for his significant research in the study of defects in gallium arsenide, silicon carbide, and other critical semiconductors. Dr. Wiff was recognized for his contributions in solving mathematical problems encountered while inferring polymer-molecular weights and mechanical relaxation distribution functions, along with his role in developing concepts for high-performance molecular composite materials and microelectromechanical system (MEMS) devices. Their selections highlight the talent, dedication, and professionalism of directorate scientists.

Background

Since its formation in 1899, the APS has become a cornerstone in the advancement and diffusion of knowledge of physics, and the primary membership organization for physicists in the United States, as well as a significant force in physics internationally. The APS Fellowship program was created to recognize members who have made advances in knowledge through original research and publication or made significant and innovative contributions in the application of physics to science and technology. No more than one-half of one percent of the organization's membership can be elected to "Fellow" status during any given year. Dr. Mitchel, recognized by APS during 1999, has been a research physicist in the directorate since 1980. His work has covered a wide range of semiconductor materials, including silicon, gallium arsenide, III-V heterostructures, and silicon carbide, with an emphasis on the determination of electronic properties and the investigation and identification of point defects. Dr. Wiff was honored during 1999 for his contributions in solving ill-posed mathematical problems in polymer molecular weight and mechanical relaxation time distribution functions, in addition to developing molecular, *in-situ* molecular, and nanocomposite polymer concepts for high-performance materials and MEMS devices. Dr. Wiff is a senior research associate whose primary research areas include low-cost recyclable composites, in-situ molecular composites, nonlinear optical polymers, aerogels for insulation and high-energy electrocapacitors, thermo-photo-hydro-chromic dyes for wall coverings, low-cost manufacturing of structural composites, and new concepts for laser hardened materials. He has been instrumental in the creation of the MEMS research and development effort for the directorate.

Senior Chemist Recognized for Polymer Research



Payoff

Dr. Fred E. Arnold's accomplishments provide a strong basis for Air Force research on polymeric materials for structural applications. The new polymeric materials resulting from Dr. Arnold's research offer tremendous potential for improving Air Force operational capabilities by providing lightweight, environmentally-resistant nonmetallic structural materials. A combination of higher temperature performance capability coupled with lower processing requirements than conventional materials make these new materials impressive candidates for next generation aircraft and space vehicle structures.

Accomplishment

A research scientist at the Materials and Manufacturing Directorate has been recognized for outstanding lifetime achievement by the 15,000-member Affiliate Societies Council of Dayton, Ohio. Dr. Arnold, a senior polymer chemist in the directorate's Nonmetallic Materials Division Polymer Branch, was recognized for numerous accomplishments supporting operational and future Air Force systems and exemplary leadership in polymer research throughout a career spanning more than 34 years. Dr. Arnold's scientific contributions greatly influenced the direction of the industrial polymer research community, Department of Defense agencies, and the National Aeronautics and Space Administration. His selection for this prestigious award enhances the directorate's reputation as an international leader in polymeric materials research and development.

Background

Dr. Arnold is an internationally recognized scientific authority and principal research scientist for the Air Force in high temperature polymers and new polymeric compositions. Since joining the directorate in 1966, he has earned worldwide recognition for his work on the chemistry of ladder and rigid-rod polymer systems and development of more than 1,000 new compositions of matter. Dr. Arnold's career accomplishments include synthesis and structural modification of a unique class of double chain ladder polymers, which exhibited novel aggregation behavior in solid state, and led to a dynamic concept in material technology ¾ non-reinforced composites. His research in ladder polymers and the insight into their unusual behavior provided the basis for his synthesis of the first known liquid crystalline benzobisazole rigid-rod polymer system. This effort earned him the 1978 Arthur S. Fleming Award as one of the 10 most outstanding young individuals in federal service. Dr. Arnold later synthesized a family of these polymers, including benzobis-imidazole, -thiazole, and -oxazole, which, despite their light weight, exhibited strength and modulus properties far exceeding those of conventional aircraft materials such as aluminum, titanium and steel, and fiber-reinforced graphite/epoxy composites evaluated for future systems. Because of their superior mechanical properties, the new polymers are of great interest for space projects, and are also being considered for use in printed wiring boards, and for applications in cryogenic tank fabrication. The availability of the new polymers led to the molecular composite concept utilizing the rigid-rod polymers as reinforcement for conventional matrix material on a molecular level. Dow Chemical realized the inherent potential and subsequently provided the required processing for commercializing the benzobisoxazole rigid-rod polymer system for aerospace and commercial applications.

Electronic Prototyping Research Team Earns AFOSR Star Team Award

Payoff

The Air Force Office of Scientific Research (AFOSR) Star Team Award fosters excellence within the research community and highlights the critical role of basic research within the Air Force's broad technology spectrum. This award is an indication of the significance of a teams research contributions and reflects leadership in science and technology transition.

Accomplishment

An AFOSR Star Team selected for the period of 2000 to 2001 consisted of researchers from the Materials and Manufacturing Directorate's Materials Process Design Branch. The award recognizes teams of researchers who have proven, through their track record, world-class status and excellence in their chosen area of basic research. The basis for the team's selection was their research contributions in the area of electronic prototyping.

Background

Highly skilled teams of creative scientists often using sophisticated equipment carry out materials research which is time-consuming and costly. It requires a huge, sustained investment over very long periods of time. Because this is also an inherently high-risk activity, success is not guaranteed. These considerations led to the investigation of numerical methods that enable computer simulations and computer experiments, greatly speeding the discovery process. In short, electronic prototyping provides researchers the means to conduct research in a virtual context. These computational methods enabled a web-based design environment and 'round-the-clock' interactions among a globally-dispersed scientific and engineering community. The product of these interactions, computational models, parallels the physical world with sufficient integrity, so that "virtual world" prototypes of proposed materials, structures, and systems may be researched, developed, designed, fabricated, tested and evaluated in a virtual reality environment. Electronic prototyping research builds upon years of experience in developing computational methods. For example, a recent result involving neural networks shows promise in the prediction of new compounds. Another recent development in neural networks was hybrid architectures, enabling the prediction of a "virtual" sensed image. One of the more pervasively useful research contributions was the development and use of novel multi-objective optimization methods, allowing concurrent prototyping of process designs/sequences for simultaneous optimization of desired material microstructure and product shape. Integrating computer simulations and optimization methods will identify more affordable processing conditions for a specific material microstructure with a specified shape. Ultimately, electronic prototyping of a multi-process sequence will enable the virtual exploration of numerous alternative processing routes, thereby providing decision makers the basis to understand the relationships among numerous processing trade-offs and their impact on product cost, producibility, and quality. While 'supercomputer' modeling and simulation demonstrates truly great achievements, a great number of challenging technical problems and opportunities still remain.

Propulsion Directorate Engineers Win Yates Tech Transfer Award

Payoff

Transfer of the Propulsion Directorate's "+100" fuel additive to Florida police departments demonstrates the huge potential of this technology to reduce costs and increase reliability for all turbine engine-powered vehicle users.

Accomplishment

Mr. Robert W. Morris and Mr. George E. Buckhalter of the Propulsion Directorate won the General Ronald W. Yates Award for Excellence in Technology Transfer. Morris and Buckhalter were recognized for their work in transferring the JP-8 +100 additive developed by the directorate's Fuels Branch to the Tampa, Florida police department and the Hillsborough, Florida sheriff's department. Major General Richard Paul, AFRL's former Commander, presented the award.

Background

The "+100" additive, developed by the directorate to increase the thermal stability of jet fuel by 100°F, is currently used in over 2,000 USAF fighter and trainer aircraft, as well as by other Air Forces. Besides the thermal stability, the fuel additive performs like fuel injector cleaner to inhibit the formation of gums, varnish, and coke, which are chief causes of power loss in turbine engines. Before using the additive, the Hillsborough and Tampa police helicopters required repetitive fuel injector cleaning to maintain availability of their helicopters. After using the "+100" additive, Tampa's police department experienced a two-fold improvement in the time interval allowed between injector cleanings, while Hillsborough's sheriff department increased their interval from 100 to 1,000 flight hours. Since using the "+100" additive, neither department's helicopters have seen any reduction in engine power, a sign of injector fouling. As part of their tech transfer effort, Mr. Morris and Mr. Buckhalter also worked with fuel pump manufacturers to develop a method to pump fuel with or without the additive. In addition, they developed procedures for documenting the additive's effect on the helicopters' engine performance. Cleaner fuel injectors, as a result of using the JP-8 +100 additive, are saving both departments thousands of dollars in maintenance costs due to a reduction in maintenance man-hours and the number of required replacement parts.

Sensors Directorate Scientist Recognized for Innovative Etching Process

Payoff

An innovative etching technology gives designers new opportunities for improving present-day device fabrication procedures. An improved via etch employing Dr. Quinlan's process could assist engineers in fabricating more compact integrated circuits. It also opens new alternatives for integrating p-type wafers into electronic and optoelectronic devices and components (e.g., solar cells, lasers, photo detectors, and micro-machined devices). Its application could be especially valuable in high-speed, high-frequency components for radar, communications, and signal processing. Dr. Quinlan's photoelectrochemical (PEC) etch method has potential for significant impacts across a wide range of sensor components.

Accomplishment

Dr. Kenneth Quinlan, a research chemist at the Sensors Directorate, recently received an R&D 100 Award which honors the 100 most significant technology products or processes of the year - technology advances deemed to have potential impacts on the quality of life of millions of people worldwide. Dr. Quinlan invented a process for etching p-type indium phosphide (p-InP) that is considerably faster, safer, simpler, and more economical than previous etching methods. The process is described in articles published in the Journal of the Electrochemical Society and is patented (US Patent 5,824,206 [20 Oct 98]).

Background

Indium phosphide, an important member of the "III-V" semiconductors, is the semiconductor material of choice for fiber optic communications devices and is becoming increasingly important for emerging electronic device applications in radar, optical communications, solar cells, and optical computing. The fabrication of electronic devices involves several critical processing steps performed on materials, including etching, metallization, and planarization. Prior to Dr. Quinlan's discovery, there were no truly successful methods for etching p-type III-V semiconductors (in p-type semiconductors, electric current is carried predominantly by positive charge entities known as "holes;" in n-type semiconductors, the charge carriers are electrons). Current etching methods are complex, time-consuming, defect-prone, and inefficient. Dr. Quinlan's new method uses the PEC technique to etch semiconductors. PEC etching is a process in which electrical and light energies are combined to remove (etch) a portion of the semiconductor. Dr. Quinlan's key insight was to employ a nitric acid solution to perform the PEC etch process. In an electrochemical cell, reverse bias voltage is applied to the semiconductor wafer while the portion of the wafer to be etched is exposed to laser light (red light was employed in his experiment, but other colors will also work). These conditions bring electrons to the surface of the InP wafer, resulting in the formation of indium metal and gaseous phosphine. The metallic indium dissolves instantly in the nitric acid, leaving behind an etched pattern that matches the pattern of the light illuminating the InP. The electrochemical cell and the chemistry of Dr. Quinlan's method are analogous to the structure and chemistry of ordinary batteries. Dr. Quinlan uses p-InP for the positive electrode and nitric acid for the electrolyte in his "battery." Dr. Quinlan's PEC etch method can be used to fabricate holes, known as "vias," through semiconductor "chips," and also fabricate more complex structures used in electronic devices and semiconductor lasers. His PEC etch method applies quite generally to III-V semiconductors and can be employed for a multitude of applications.

Sensors Scientists Receive IEEE Award for Outstanding Paper

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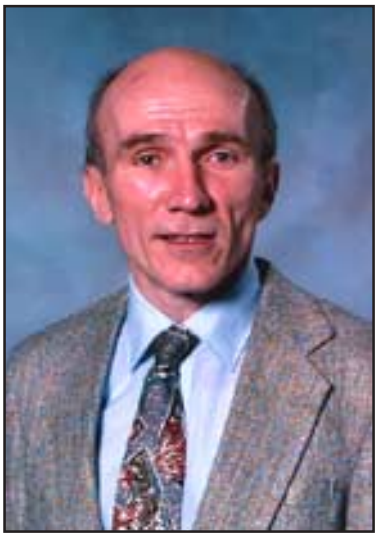

Payoff

Dr. Paul McManamon and Dr. Edward Watson of the Sensors Directorate were the first to publish a comprehensive review of completed work in optical phased array technology, providing scientists with a complete knowledge base to enhance opportunities for further developments. In the past, phased array technology was applied to microwave radar, but never before applied to optical systems. The Institute of Electrical and Electronics Engineers, Inc. (IEEE) Society recognized the significance of this accomplishment and awarded Drs. McManamon and Watson the 1998 W.R.G. Baker Prize Paper Award for best original research reported in a year's period.

Accomplishment

The IEEE recognized Dr. McManamon and Dr. Watson for the most outstanding paper reporting original research work. The IEEE W.R.G. Baker Prize Award, established in 1956, is one of IEEE's three major awards recognizing distinguished published material. The IEEE is the world's largest technical professional society with more than 320,000 members.

Background

Current laser radar and other electro-optical systems are high in cost and limited in performance due to the mechanical method used to direct and stabilize the system. The optical gimbal, currently used in fielded fighter-based radar systems, is unreliable and requires frequent repair or replacement. Even with current manufacturing processes, assembly of these mechanical gimbals is complex, precise, and expensive. Optical phased array technology has the potential to overcome many of the limitations of mechanical steering technology. Liquid-crystal-base phased arrays require little power, are random-access, and are insensitive to accelerations. Though currently expensive, their manufacturing cost can be reduced through volume production. Because phased array systems have no moving parts and only use beams of energy, they can provide the Air Force with robust, reliable, and cost-effective systems. Two directorate engineers recognized that publishing on-going research could enhance further research in this area and, thus, published a paper about laser radar in a special edition for IEEE. The paper, "Optical Phased Array Technology," outlined the technology developed for phased array steering of optical sensors.

Ms. Marilyn Shaw Receives 1999 Business Development Award

Payoff

Ms. Marilyn Shaw of the Sensors Directorate's Sensor Applications and Demonstrations Division, received the International Defense Electronics Association of Old Crows Business Development Award for her role in developing more than $5 million in new business for the directorate.

Accomplishment

Ms. Shaw was presented the 1999 Business Development Award by the International Defense Electronics Association of Old Crows for her marketing excellence in the electronic warfare environment. Her marketing activities expanded the customer contacts and business base of the directorate's Integrated Demonstrations and Applications Laboratory.

Background

Ms. Shaw was recognized for her performance in marketing electronic warfare programs and technology products to the Department of Defense, international defense organizations, and defense industry through technology exhibits. Her marketing activities and exhibits demonstrate leading-edge innovative electronic warfare technology research. The exhibit at the 33rd Association of Old Crows Convention in Washington D.C. won first prize for the best exhibit in the government category. She is the leader of the directorate's marketing team, which supported more than 12 trade shows during 1999. Ms. Shaw produced an innovative, interactive exhibit allowing visitors to visually see directorate products through an F-16 simulator. As project manager for the Integrated Electronic Warfare System Effectiveness Evaluation Research program, she directs a 15-person integrated product team.

Mr. William Taylor Receives 1999 Electro-Optics/Infrared Award

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Payoff

Mr. William R. Taylor of the Sensors Directorate received the International Defense Electronics Association of Old Crows 1999 Electro-Optics/Infrared Award for his role as the focal point for electro-optical and infrared countermeasures.

Accomplishment

The International Defense Electronics Association of Old Crows presented Mr. Taylor the 1999 Electro-Optics/Infrared Award for his efforts in promoting the development and testing of infrared countermeasures. His coordination was instrumental in obtaining other major command support for the electro-optical and infrared countermeasures program.

Background

Mr. Taylor is the focal point for electro-optical and infrared countermeasures (EO/IRCM) in the Electro-Optical Warfare Branch of the Electro-Optical Sensor Technology Division. During 1999, his distinguished efforts promoted the development and testing of infrared countermeasures. He was credited with developing AFRL's first EO/IRCM roadmap, which integrates all expendable and laser-based countermeasure efforts between the Directed Energy and Sensors Directorates, and includes near-, mid-, and far-term technology solutions for mobility and fast jet aircraft through the year 2015. In conjunction with this roadmap, Mr. Taylor also led the development of a concept of operations for electro-optical and infrared countermeasure systems, which outlines the strategy for EO/IRCM development in the future.

Mr. Paul Westcott Receives 1999 Life Achievement Award from Old Crows

Payoff

Mr. Paul Westcott was presented the Life Achievement Award by the International Defense Electronics Association of Old Crows (AOC) for his contributions in achieving the aims and purposes of the association.

Accomplishment

The International Defense Electronics Association of Old Crows presented Mr. Westcott the 1999 Life Achievement Award for his lifelong achievements for the association. He has been actively involved in the electronics association since 1970.

Background

For more than 30 years, Mr. Westcott served the AOC in many different capacities. He served on the board of directors from 1986 until 1997 and served as the national chapter's vice president from 1993 to 1997. He also served as chairman for the election, awards, convention, and Capital Hill Roundup committees. Westcott served the local Kittyhawk chapter for 30 years, including 10 years on the board of directors and four years as Kittyhawk's vice president. In 1997, he received the association's Silver Medal. For his outstanding volunteer service, he was honored with the National Association of Old Crows Recognition Plaque and awarded the AOC Gold Certificate of Merit several times. During his career in the Sensors Directorate, formerly the Avionics Directorate, he received the Engineer of the Year Award in 1982 and Manager of the Year Award in 1989.

Dr. Altshuler Awarded IEEE Millennium Medal

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Payoff

The Boston Section of the Institute of Electrical and Electronic Engineers (IEEE) presented Dr. Edward E. Altshuler of the Sensors Directorate, the Millennium Medal in recognition of his contributions and outstanding service to the IEEE Boston Section. This honor, created for the year 2000, is bestowed upon a select group of IEEE members for outstanding contributions to a section or a society.

Accomplishment

Dr. Altshuler from the directorate's Antenna Technology Division received the IEEE Millennium Medal in recognition of his outstanding contributions to the IEEE Boston Section, which has over 10,000 members.

Background

The IEEE is the world's largest technical professional society with more than 320,000 members. Dr. Altshuler served the society as chairman in a variety of positions, including the Antennas and Propagation Society in 1964, the International Antennas and Propagation Society Symposium in 1968, the Boston Section Fellows and Awards Committee in 1993-94, and the Boston Section 1995-1996. He is currently chairman of the Boston Section Life Members Chapter. Dr. Altshuler was elected a Fellow of the IEEE in 1984 and received the IEEE Harry Diamond Memorial Award in 1997. Dr. Altshuler has over 100 scientific publications, patents, and presentations. He has been a member of the Boston Section for over 45 years.

Dr. Huybrechts Wins Arthur S. Flemming Award for Structures Research

Payoff

Dr. Steven Huybrechts of the Space Vehicles Directorate was selected as a 1999 winner of the prestigious Arthur S. Flemming Award for his work on space structural systems. He received the award for the integration of innovative structural concepts and composite materials into space systems.

Accomplishment

Dr. Huybrechts received this award for his work in integrating advanced composite materials into launch vehicle and spacecraft structures. His work included development, demonstration, transition, and application of several revolutionary structural concepts such as grid-stiffened structures, ChamberCore structures, structures for deployable optics, and the PowerSail concept. This work resulted in five pending patents (one awarded) and dozens of publications. In addition to winning the Arthur S. Flemming Award, Dr. Huybrechts, now Chief of the Spacecraft Component Technologies Branch, was selected as the 1999 AFMC nominee for the Air Force Association (AFA) Civilian Senior Manager of the Year Award. Additionally, his branch, recently named as a center of excellence, received the AFMC nominee for the AFA Theodore Von Karman Award, given every year to the most successful research team in the Air Force.

Background

The Arthur S. Flemming Awards program, established in 1948, recognizes recipients in 12 categories involving basic and applied science and administration. These awards honor young federal government employees, military and civilian, for significant contributions and government service. This program is the only award program open to all federal government employees where the selection board consists entirely of industry representatives.

Dr. Reinhardt Receives the 2000 Rotary National Award for Space Achievement

16

Payoff

Dr. Kitt C. Reinhardt (left) received the 2000 Rotary National Award for Space Achievement (RNASA) from Astronaut Michael Foale. Reinhardt was acknowledged for his significant contributions toward the development of next-generation, high-efficiency space solar cells. This award is a tribute to Reinhardt and his photovoltaics research and development team who presently lead the world in developing future space solar cell and solar array technologies.

Accomplishment

Dr. Reinhardt, a solid-state physicist in the Space Vehicles Directorate's Spacecraft Component Technology Branch, accepted the 2000 RNASA Stellar Award during ceremonies at the National Aeronautics and Space Administration's Johnson Space Center for his role in developing the world's first 25% efficient multijunction solar cells used by today's spacecraft and for designing a new 35% efficient solar cell that resulted in a US patent and $250,000 in royalties.

Background

The new 25% efficient solar cells provide a 35% increase in available power for the same area of solar panel, while reducing the cost per watt by 15-20% when compared to previous state-of-the-art cells. The solar cells are a direct replacement for existing cells and allow the use of the same substrate panels and deployment mechanisms. The "mass per unit" area is also unchanged. Reinhardt studied the top-junction of the 3-junction 25% solar cell for his doctoral dissertation and recommended the 3-junction gallium indium phosphide/gallium arsenide/germanium cell design be selected for the 25% efficient Manufacturing Technology Solar Cell program in 1995. The resulting 25% solar cell technology achieved complete market penetration of US government and commercial spacecraft. For example, Hughes Space and Communications HS601 and HS702 spacecraft both use this technology exclusively. Foreign companies, however, are not expected to manufacture these products for at least five years.